identifier and HNB address. The received messages can be routed to the HNB using HNB IP address, Ethernet address or address translation as necessary. Based on TEID and HNB IP address, eNB determines the destination HNB for the intercepted message and forwards the message to HNB. Therefore, messages tunnelled between eNB and the core network are relayed to the HNB and tunnelling of connections is enabled also for HNBs connecting to the network through macro-layer eNB. The embodiment of the invention can be thus utilized for providing S1 and X2 interfacing to the HNB, as macro-layer eNB is configured to identify TEID in the received messages. Consequently, also messages received from HNB in eNB are identified based on the radio bearer identifier to be mapped to the correct access bearer identified by TEID between eNB and core network, or alternatively to the correct access bearer identified by TEID on the X2 interface between the macro-layer eNBs. Mapping to correct bearer using TEID on the X2 interface facilitates communications between HNBs and HNB to eNB, which may be used in handover scenarios in LTE.

[0037] Accordingly, the core network node such as MME/S-GW or S-GW stores routing information, for example for routing IP traffic. The information may be IP addresses for example. As tunnelling through GTP-U is set up in the conventional way in LTE, the core network node is also aware of TEIDs associated with certain eNB. The core network node may route traffic to eNBs, thus by sending GTP-U messages with certain TEID to eNBs associated with the certain TEID. The core network node may, thus stored association between TEID and eNB, for example association between TEID and eNB IP address. Consequently, the core network node identifies TEID in GTP-U message and routes the IP packets comprising the GTP-U message to the eNB providing tunnelling the associated TEID. HNBs connecting to the network through a macro-layer eNB can in such a way be reached by the core network S1 logical interface communication, as the S1 communication using GTP-U, is directed to the macro-layer eNB connecting HNB to network.

[0038] FIG. **3** illustrates protocol stacks according to an embodiment of the invention operating in LTE E-UTRAN. Specifically, the protocol stacks consider the control plane where application layer messages are delivered between eNB and MME or MME/S-GW using application layer signalling protocol, S1 application protocol (S1_AP). In the embodiment HNB is provided S1 connection through S1 relay application Protocol (S1_R-AP) **302** implemented in HNB **112** and **106** eNB as in FIG. **1**. S1_R-AP is a peer-to-peer protocol between eNB and HNB. S1_R-AP in eNB may have multiple peer entities each set up and assigned for a HNB connected to it. With S1_R-AP, it is possible to connect several HNBs to eNB by implementing S1_R-AP **302** in HNBs **116** and **118** and connecting them with peer-to-peer connections to eNB **110** implementing S1_R-AP peer entities for both HNB connections, for example. According to the embodiment of FIG. **3**, the S1 traffic of HNB **112** is received with S1_AP at eNB **106** from MME **102**. As S1 AP is only between eNB and MME, HNB **112** S1 interface is, therefore, tunnelled via S1-AP between MME and eNB. The eNB identifies the tunnelled S1 connection traffic destined to HNB connected to eNB and relays the S1 traffic to HNB. When S1_R-AP traffic is received from HNB in eNB, the eNB tunnels the HNB S1 application layer messages through the S1_AP to MME. The task of S1_R-AP is to provide the S1 interface to HNBs connected to eNB. Therefore, messages destined to HNB and received in eNB, are identified and forwarded to HNB using S1_R-AP. S1_R-AP may provide only a subset of operations S1-AP provides to eNB. HNB, eNB and MME in FIG. **3** implement TNL (transport network layer) protocols **310** for routing the traffic between each other. In LTE, these protocols include IP protocol for example. Therefore, HNB eNB and MME, thus the LTE network, can use IP addressing in routing messages such as S1 and X2 interface messages between each other. Accordingly, the nodes are configured to decode messages sent using TNL protocols and determine based on the IP address of the message, the recipient of the message. TNL protocol stack used in FIG. **3**, may also implement addressing used in Ethernet standard defined in IEEE 802.3. Thus, the network nodes implementing the protocol stacks in FIG. **3** may be configured to decode the received messages and determine the recipient of the message based on Ethernet addresses.

[0039] FIGS. **4** and **5** present flow charts describing the operational steps performed by an apparatus according to the invention. According to an embodiment, the apparatus is LTE E-UTRAN eNB connecting HNB to network and providing core network connectivity to HNB. In LTE, eNB has S1 and X2 interfaces and it connects with HNB using S1_R-AP add X2 interface. Referring to FIG. **3**, eNB may implement a protocol stack comprising S1-AP protocol **306** for communication with the core network node such as MME and S1_R-AP for connecting HNB to network and enabling S1 layer communication with core network node such as MME.

[0040] In FIG. **4**, the operation starts in **400**. eNB receives communication, such as messages, from core network through S1 interface and using S1-AP protocol in **402**. In **404** eNB derives from the received communication messages destined to HNB. The deriving may comprise identifying HNB messages from the communication using identifiers in the messages. In **406** eNB prepares the derived messages to be transmitted to HNB. The prepared message may comprise all or part of the identified messages. In **408** eNB transmits the derived and prepared messages to HNB. The operation ends in **410**.

[0041] In FIG. **5** the operation starts at **500**. In **502** eNB receives communication from HNB. The communication may be S1_R-AP or X2 messages. In **504**, eNB determines the message type, based on whether the message received from HNB is received on S1 or X2 interface. This may involve identifying the messages based on identifiers in the message. Thus eNB may store mapping between the identifiers and for example bearers on the S1 and X2 interface. In case the message is received on S1, the message is a message using S1_R-AP as in FIG. **3**, protocol **302**. Then in **506**, eNB prepares a message according to S1-AP protocol **306** as in FIG. **3**, and transmits in **508** the received S1 communication from HNB to the core network node such as MME or S-GW. The preparing may comprise mapping the identified message to be sent on the correct bearer to the core network node, according to the stored mapping. The mapping may also store the addresses to be used with the bearers, such as IP addresses. In case the message is received from HNB in **502** on X2 interface, eNB identifies the destination of the message in **510** for example using the stored mapping and transmits the messages towards it destination in **512**. The operation ends in **514** after transmitting the received message in **508** or **512**.

[0042] FIG. **6** shows exemplary messaging according to an embodiment of the invention. The messaging takes place in LTE network and considers exemplary usage scenarios of S1